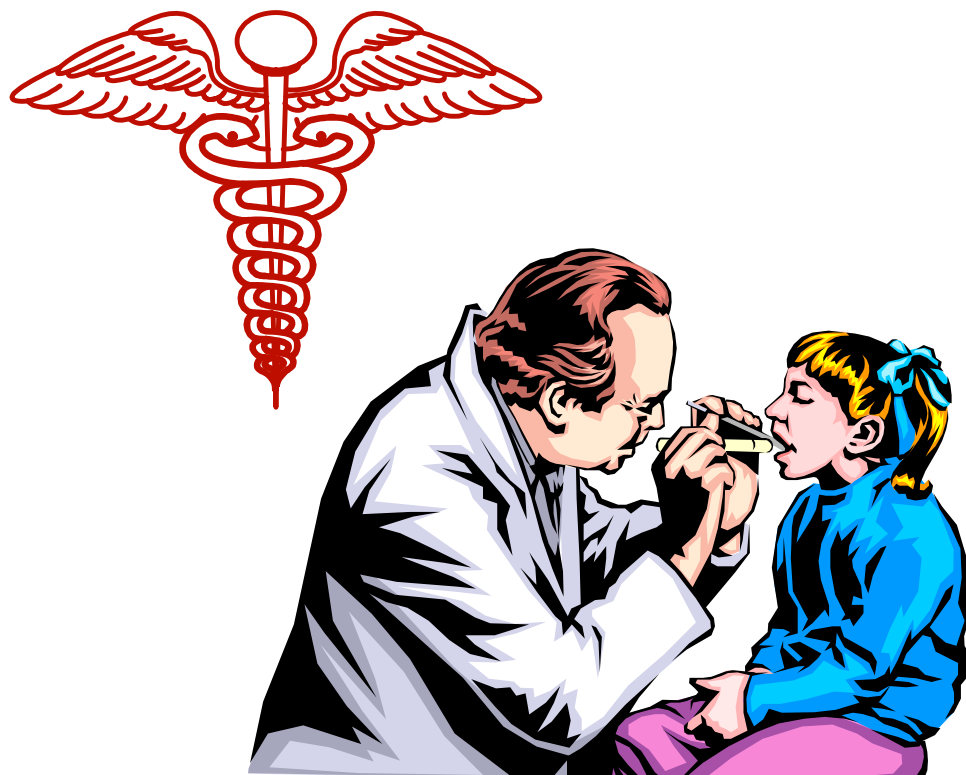


The Economic Impact of the Central Oklahoma Family Medical Center on the Economy of Konawa, Oklahoma



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The Economic Impact of the Central Oklahoma Family Medical Center on the Economy of Konawa, Oklahoma

EXECUTIVE SUMMARY

Across the United States, community health centers provide access to vital health care services for many residents. Many of the residents served by these community health centers are financially distressed and are in need of affordable health care. The role of the community health care centers in terms of the provision of health care services is very well understood; however, the additional role the community health centers play as a major contributor to the community economy is often overlooked. This report measure the economic impact of the Central Oklahoma Family Medical Center on the community economy of Konawa, OK.

Konawa is located in central Oklahoma in Seminole County. The 2000 census population for Konawa was 1,479 and for the Konawa zip code area was 3,318. There are no other medical services in the community zip code area. The closest hospital is 16 miles away in Ada, Oklahoma.

The model employed to measure the economic impact was the input-output model; the data were from IMPLAN. The community health center has employment of 136 and a payroll with benefits of \$7.8 million. As the center and its employees spend money in Konawa, secondary employment and income are generated in the other businesses and industries in the area. The secondary impacts are measured by multipliers derived from the model. The total impact of the center including secondary benefits is 173 employees and \$8.8 million in income (payroll and benefits). It is estimated that \$2.5 million of the income is spent in retail stores in Konawa and generates sales tax.

This is a huge economic benefit to this small community. The methodology developed in the report is easily transferred to other rural communities with community health centers across the nation. A community considering the initiation of a community health center or other clinic/center that needs community support could greatly benefit from an economic impact study.

The Economic Impact of the Central Oklahoma Family Medical Center on the Economy of Konawa, Oklahoma

INTRODUCTION

Across the United States, community health centers provide access to vital health care services for many residents. Many of the residents served by these community health centers are financially distressed and are in need of affordable health care. The role of the community health care centers in terms of the provision of health care services is very well understood; however, the additional role the community health centers play as a major contributor to the community economy is often overlooked. The objective of this report is to measure the economic impact a community health center, the Central Oklahoma Family Medical Center, has on the rural economy of Konawa, Oklahoma. More specifically, the report will:

1. Review economic trends of the health care sector in the United States;
2. Review economic trends of the health care sector in the community health center's local economy;
3. Present employment and payroll of the community health center; and
4. Measure the economic impact of the community health center on the local economy.

TRENDS IN THE HEALTH CARE INDUSTRY

National Trends

The health care sector is an extremely fast growing sector, and based on the current demographics, there is every reason to expect this trend to continue. Data in **Table 1** provide selected expenditure and employment data for the United States. Several highlights from the national data are:

Table 1
United States Health Expenditures and Employment Data
1970-2005; Projected for 2009 & 2013

United States Data								
	Year	Total Health Expenses (\$\$ Billions)	Per Capita Health Exp. (\$\$)	Health Expense as % of GDP (%)	Health Sector Emp. ¹ (000)	Ave. Yrly. Increase in Emp. (%)	Health & Soc. Asst. Emp. (000)	Ave. Yrly. Increase in Emp. (%)
Based on SIC¹	1970	\$73.10	\$348	7.0%	3,052			
	1980	245.8	1,067	8.8%	5,278	7.3%		
	1990	696.0	2,738	12.0%	7,814	4.8%	9,296	N/A
	1995	990.2	3,650	13.4%	9,230	3.6%	11,278	4.3%
	1996	1,039.9	3,791	13.3%	9,478	2.7%	11,605	2.9%
	1997	1,093.1	3,938	13.1%	9,703	2.4%	11,932	2.8%
	1998	1,150.3	4,179	13.1%	9,853	1.5%	12,214	2.4%
	1999	1,222.6	4,402	13.2%	9,977	1.3%	12,477	2.2%
	2000	1,309.4	4,670	13.3%	10,103	1.3%	12,718	1.9%
	2001	1,420.7	5,021	14.1%	10,381	2.8%	13,134	3.3%
	2002	1,553.0	5,440	14.9%	10,673	2.8%	13,556	3.2%
Based on NAICS²	Projections							
	2003	1,673.6	5,808	15.3%	N/A	N/A	13,893	2.5%
	2004	1,793.6	6,167	15.5%	N/A	N/A	14,187	2.1%
	2005	1,920.8	6,546	15.7%	N/A	N/A	14,433	1.7%
	2009	2,565.0	8,446	17.1%	N/A	N/A		
	2013	3,358.1	10,709	18.4%	N/A	N/A		

SOURCES: Bureau of Labor Statistics; Bureau of Economic Analysis; Centers for Medicare & Medicaid Services, National Health Expenditures 1980-2003 and National Health Expenditure Projections 2004-2013, website: <<http://cms.hhs.gov>>

N/A - Not Available

¹ Based on SIC codes for health sector employment

² Based on NAICS codes for health and social assistance

- In 1970, health care services as a share of the national gross domestic product (GDP) were 7.0 percent. This was projected to have increased to 15.5 percent in 2004;
- Per capita health expenditures increased from \$348 in 1970 to \$6,167 in 2004;
- Employment in the health sector increased 250 percent from 1970 to 2002; and
- Annual increases in employment from 1995 to 2002 ranged from 1.3 percent up to 3.6 percent.

In addition, the Bureau of Labor Statistics projects substantial increases in health care expenditures from 2003 through 2013; in fact, it is predicted that health care expenditures will account for 17.1 percent of GDP by 2009 and increase up to 18.4 percent of GDP in 2013. Per capita health care expenditures are projected to increase to \$8,446 in 2009 and up to \$10,709 in 2013. Total health expenditures are projected to increase to over \$3 trillion in 2013. Of the 15.5 percent of GDP or \$1.7 trillion spent on health care in 2004, thirty-one percent of the expenditures were for hospital care and another 22 percent were for physician services (**Figure 1**).

Local Trends

Konawa is located in southeast Oklahoma in Seminole County and close to the border of Pottawatomie County. The medical service area comprises part of Seminole and Pottawatomie Counties (**Figure 2**) and is based on the 74849 Konawa zip code area. The populations for the City of Konawa, the 74849 Konawa zip code area (2000 census year only), Seminole County, and the State of Oklahoma are presented in **Table 2** to show population trends from 1990, 2000, and 2003. From 1990 to 2000 and from 2000 to 2003 the population decreased or was estimated to decrease for both the City of Konawa and Seminole County, while the State of Oklahoma increased or was estimated to increase during these same time periods.

Figure 1.
National Health Expenditures
as a Percent of Gross Domestic Product and by Health Service Type, 2004

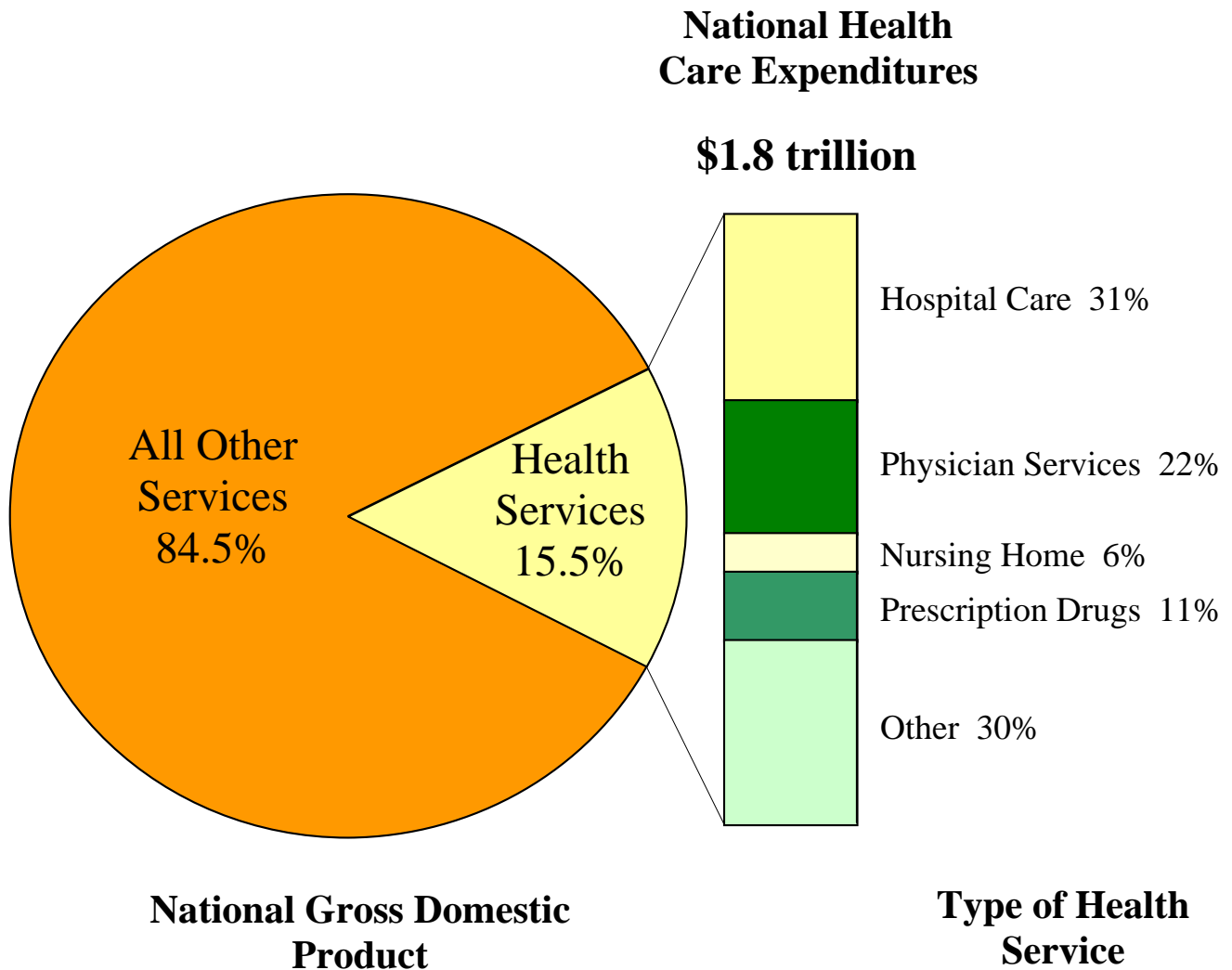


Figure 2
Konawa Medical Service Area – Zip Code 74849

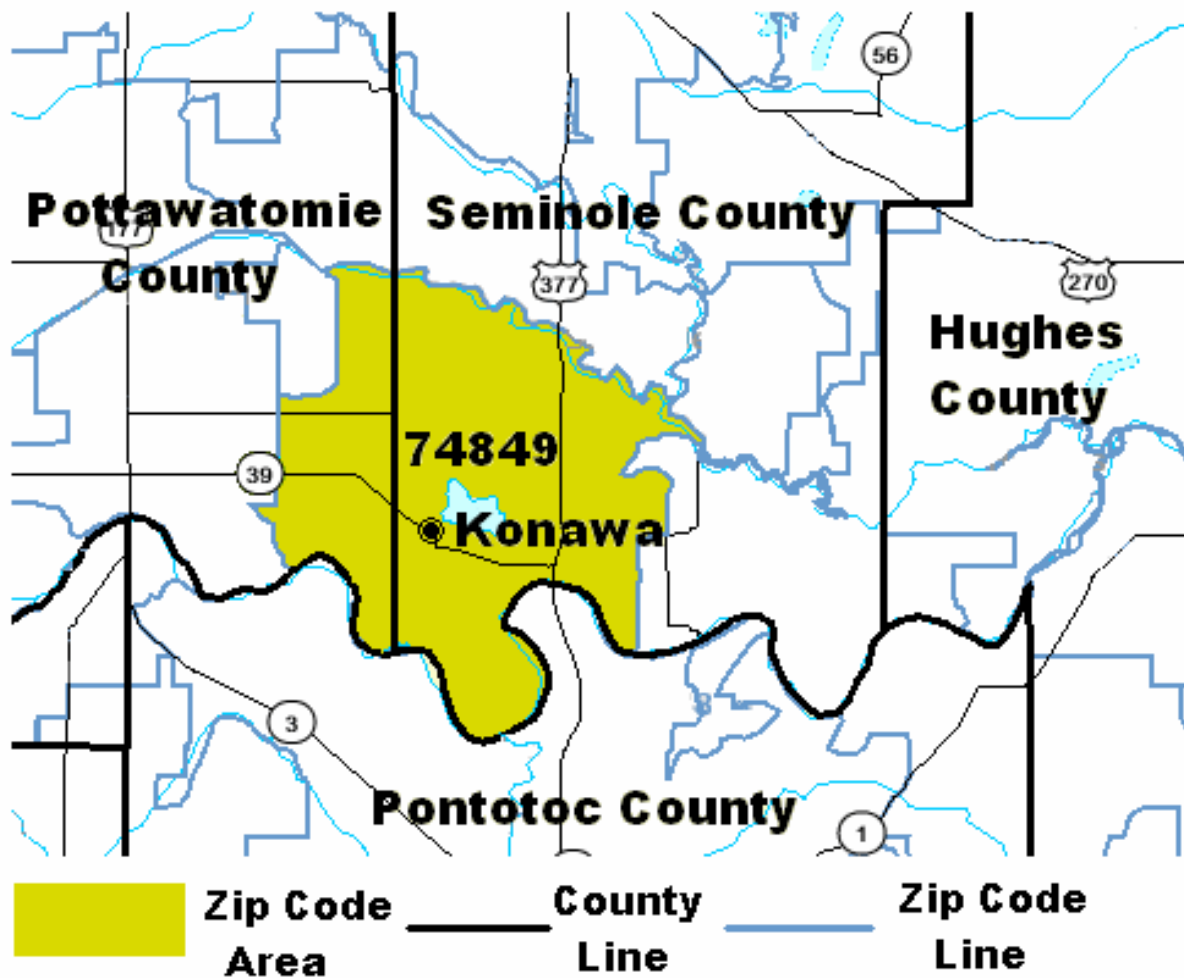


Table 2
Population and Population Estimates
for Konawa, Seminole County, and the State of Oklahoma, 1990, 2000, and 2003

	City of Konawa	74849 Konowa Zip Code Area	Seminole County	State of Oklahoma
1990 Census	1,508	na	25,412	3,145,585
2000 Census	1,479	3,318	24,894	3,450,654
2003 Census Estimate	1,432	na	24,516	3,506,469
1990-2000 % change	-1.9%	na	-2.0%	9.6%
2000-2003 % change	-3.1%	na	-1.5%	1.6%

SOURCE: U. S. Census Bureau, 1990 and 2000 census data and 2003 census estimates.
na - Data not available.

Data are presented in **Table 3** illustrating population by age breakdown for the 74849 Konawa zip code area for the census year 2000. The population of the medical service area was 3,318. The population of the age 65 and older age groups was 529 and comprised 16 percent of the medical service area. The population by race and Hispanic ethnic group is illustrated in **Table 4**. Native Americans represented 21.5 percent of the population in the medical service area and whites 71.2 percent. The population of Hispanic ethnicity was 3.8% of the total.

Data in **Table 5** are from the U. S. Census Bureau, County Business Patterns, and illustrate how the health sector is growing over time in Seminole County. Based on the Standard Industrial Classification (SIC) system from 1988 through 1997, the health services sector employment grew 54.2 percent in Seminole County compared to total county employment growth of only 17.6 percent; the health services sector payroll grew 72.4 percent compared to the total county payroll growth of only 40.0 percent during the same time period from 1998 through 1997. Based on the North American Industry Classification System (NAICS) from 1998 through 2003, health services employment decreased 17.7 percent compared to total county employment decreasing 11.3 percent; the health services payroll increased 20.8 percent compared to total county payroll increasing only 8.1 percent during the same time period from 1998 through 2003. The health services sector accounted for 18.5 percent of the total county employment in 1988. In 2003, employment in health services comprised 17.2 percent of the county's employment.

Table 3
Population by Age Groups
for 74849 Konawa Zip Code Area, 2000

Age Groups	Zip Code Area 74849
Under 5 years	212
5 to 9 years	260
10 to 14 years	282
15 to 19 years	255
20 to 24 years	198
25 to 34 years	347
35 to 44 years	465
45 to 54 years	445
55 to 59 years	177
60 to 64 years	148
65 to 74 years	295
75 to 84 years	168
85 years and over	<u>66</u>
Total	3,318

Source: U. S. Census Bureau, 2000 Census

Table 4
Population by Race Groups and Hispanic Origin
for 74849 Konawa Zip Code Area, 2000

Race or Ethnicity	Population Numbers	Percent
By One Race or More		
One race	3,144	94.8%
Two or more races 2/	<u>174</u>	<u>5.2%</u>
Total	3,318	100.0%
By Race		
White	2,361	71.2%
Black or African American	43	1.3%
Native American 1/	714	21.5%
Asian Americans	5	0.2%
Native Hawaiian/Other Pacific Islander	0	0.0%
Some other race	21	0.6%
Two or more races 2/	<u>174</u>	<u>5.2%</u>
Total	3,318	100.0%
Hispanic or Latino (of any race) 4/	124	3.8%

SOURCE: U.S. Census Bureau, Census data for 2000

1/ Native American include American Indians and Alaska Natives.

2/ Two or more races indicate a person is included in more than one race group.

4/ Hispanic population is not a race group but rather a description of ethnic origin; Hispanics are included in the all of the above race groups.

Table 5
Employment and Payroll for Seminole County, Oklahoma, 1988-2003

		Employment			Payroll (\$1,000s)		
		Health Services	Percent of Total	Total Employment	Health Services	Percent of Total	Total Payroll
Based on SIC	1988	559	11.2%	5,005	\$7,207	10.1%	\$71,636
	1989	686	13.7%	4,994	4,972	7.7%	64,843
	1990	761	15.3%	4,973	6,134	9.0%	67,891
	1991	803	15.9%	5,037	6,883	9.7%	70,968
	1992	586	11.8%	4,976	6,059	8.1%	74,811
	1993	738	13.6%	5,438	8,682	10.1%	86,263
	1994	875	16.0%	5,456	10,114	12.3%	82,550
	1995	918	15.8%	5,811	10,773	12.4%	86,662
	1996	908	16.3%	5,585	11,236	12.1%	93,189
	1997	862	14.6%	5,885	12,422	12.4%	100,320
% Change from 1988 to 1997		54.2%		17.6%	72.4%		40.0%
Based on NAICS	1998	1,133	18.5%	6,127	\$14,394	14.0%	\$102,873
	1999	1,002	17.7%	5,664	15,049	14.4%	104,656
	2000	1,052	17.0%	6,189	15,475	13.2%	117,484
	2001	979	15.7%	6,224	14,968	12.6%	118,715
	2002	969	16.3%	5,939	20,016	16.5%	121,092
	2003	933	17.2%	5,435	17,381	15.6%	111,204
% Change from 1998 to 2003		-17.7%		-11.3%	20.8%		8.1%

Source: U.S. Census Bureau County Business Patterns; 1988-1997 based upon Standard Industrial Classification (SIC) system and 1998-2003 based upon North American Industrial Classification System (NAICS). Data are excluded for self-employed persons, employees of private households, railroad employees, agricultural production workers, and for most government employees (except for those working in wholesale liquor establishments, retail liquor stores, federally-chartered savings institutions, Federally-chartered credit unions, and hospitals).

1

The SIC major group includes establishments primarily engaged in furnishing medical, surgical, and other health services to persons; establishments of associations or groups, such as Health Maintenance Organizations (HMOs), primarily engaged in providing medical or other health services to members are included; hospices are also included in this major group.

The NAICS Health Care and Social Assistance sector includes establishments providing health care and social assistance for individuals. The industries in this sector are arranged on a continuum starting with those establishments providing medical care exclusively, continuing with those providing health care and social assistance, and finally finishing with those providing only social assistance. The services provided by establishments in this sector are delivered by trained professionals; all industries in the sector share this commonality of process, namely, labor inputs of health practitioners or social workers with the requisite expertise. Many of the industries in the sector are defined based on the educational degree held by the practitioners included in the industry.

THE DIRECT ECONOMIC ACTIVITIES

Employment and payroll are the important direct economic activities created in the Central Oklahoma Family Medical Center service area. The services provided by the clinic are divided into:

- Physicians, dentists and other medical professionals;
- Pharmacy;
- Home health; and
- Other medical and health services

The Central Oklahoma Family Medical Center employs 136 full-time and part-time employees and has a payroll including benefits of \$7.8 million (**Table 6**). The health care services provided by the medical center are typical of many community health centers. The health services in the Central Oklahoma Family Medical Center include medical, dental, pharmacy, home health care, behavioral health, laboratory, and nutritional counseling services. It is estimated that the health sector component that includes the physicians, dentists, and other medical professionals employs 95 full-time and part-time employees with an annual payroll of \$6,444,000. The pharmacy component employs 10 full-time and part-time employees, with an estimated payroll of \$440,000. A total of 17 full-time and part-time employees are included in the home health care component with a payroll of \$426,000. The other medical and health services component includes 14 full-time and part-time employees and a payroll of \$490,000. It is important to break the services into these four health sector components as the model analyzes each of them separately.

Table 6
Direct Economic Activities
of Central Oklahoma Family Medical Center

Medical Component	Estimated Employees	Estimated Payroll
Physicians, Dentists & Other Medical Professionals	95	\$6,444,000
Pharmacy	10	\$440,000
Home Health	17	\$426,000
Other Medical & Health Services Includes behavioral health, laboratory, and nutrition counseling	<u>14</u>	<u>\$490,000</u>
Totals	136	\$7,800,000

SOURCE: Local employment data and estimated income data.

SOME BASIC CONCEPTS OF COMMUNITY ECONOMICS AND INCOME AND EMPLOYMENT MULTIPLIERS

Figure 3 illustrates the major flows of goods, services, and dollars of any economy. The foundation of a community's economy are those businesses which sell some or all of their goods and services to buyers outside of the community. Such a business is a basic industry. The flow of products out of, and dollars into, a community are represented by the two arrows in the upper right portion of **Figure 3**. To produce these goods and services for "export" outside the community, the basic industry purchases inputs from outside of the community (upper left portion of **Figure 3**), labor from the residents or "households" of the community (left side of **Figure 3**), and inputs from service industries located within the community (right side of **Figure 3**). The flow of labor, goods, and services in the community is completed by households using their earnings to purchase goods and services from the community's service industries (bottom of **Figure 3**). It is evident from the interrelationships illustrated in **Figure 3** that a change in any one segment of a community's economy will have reverberations throughout the entire economic system of the community.

Consider, for instance, the closing of a clinic. The services section will no longer pay employees and dollars going to households will stop. Likewise, the clinic will not purchase goods from other businesses and dollar flow to other businesses will stop. This decreases income in the "households" segment of the economy. Since earnings would decrease, households decrease their purchases of goods and services from businesses within the "services" segment of the economy. This, in turn, decreases these businesses' purchases of labor and inputs. Thus, the change in the economic base works its way throughout the entire local economy.

The total impact of a change in the economy consists of direct, indirect, and induced impacts. Direct impacts are the changes in the activities of the impacting industry, such as the

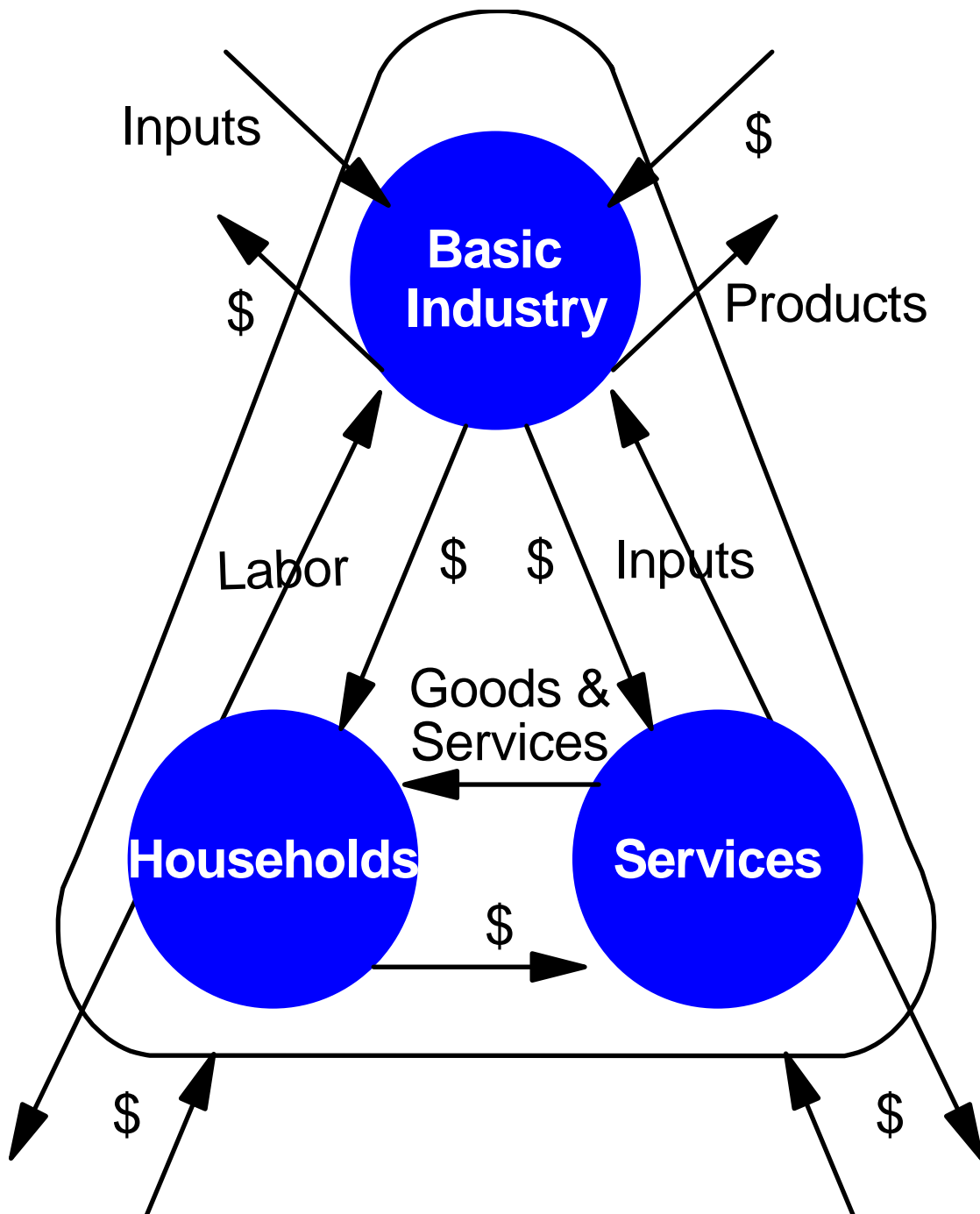


Figure 3.
Community Economic System

closing of a clinic. The impacting business, such as the clinic, changes its purchases of inputs as a result of the direct impact. This produces an indirect impact in the business sectors. Both the direct and indirect impacts change the flow of dollars to the community's households. The households alter their consumption accordingly. The effect of this change in household consumption upon businesses in a community is referred to as an induced impact.

A measure is needed that yields the effects created by an increase or decrease in economic activity. In economics, this measure is called the multiplier effect. Multipliers are used in this report. An employment multiplier is defined as:

the ratio between direct employment, or that employment used by the industry initially experiencing a change in final demand and the direct, indirect, and induced employment.

An employment multiplier of 2.0 indicates that if one job is created by a new industry, 1.0 jobs are created in other sectors due to business (indirect) and household (induced) spending.

TOTAL ECONOMIC IMPACT OF CENTRAL OKLAHOMA FAMILY MEDICAL CENTER ON THE LOCAL ECONOMY

Employment and income multipliers for the service area have been calculated by use of the IMPLAN model. It was developed by the U.S. Forest Service and is a model which allows for development of zip code or county multipliers. Additional information on IMPLAN is included in the appendix.

Applying the employment multipliers to the employment for each of the health sector components yields an estimate of each component's employment impact on the Central Oklahoma Family Medical Center service area (**Table 7**, columns 2, 3, and 4). For example, the physicians, dentists & other medical professionals have employment of 95 employees; applying the employment multiplier of 1.31 to the employment number of 95 brings the total employment impact of the hospital to 125 employees ($95 \times 1.31 = 125$). The pharmacy component has a

Table 7
Direct Economic Activities
of Central Oklahoma Family Medical Center on the Local Economy

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Employment			Income (Payroll)			Retail Sales/ Sales Tax Collections	
Medical Component	Nos.	Multiplier	Impact	Amount	Multiplier	Impact	Sales Impact	1 % Sales Tax
Physicians, Dentists & Other Medical Professionals	95	1.31	125	\$6,444,000	1.12	\$7,223,357	\$2,109,220	\$21,092
Pharmacy	10	1.13	11	\$440,000	1.13	\$497,823	\$145,364	\$1,454
Home Health	17	1.12	19	\$426,000	1.11	\$473,620	\$138,297	\$1,383
Other Medical & Health Services	<u>14</u>	1.29	<u>18</u>	<u>\$490,000</u>	1.29	<u>\$629,662</u>	<u>\$183,861</u>	<u>\$1,839</u>
Totals	136		173	\$7,800,000		\$8,824,462	\$2,576,743	\$25,767

SOURCE: Local employment data and estimated income data.

direct impact of 10 employees and with the application of the multiplier of 1.13, the total impact comes to 11 employees. The home health care component has direct employment of 17, a multiplier of 1.12, for a total impact of 19 employees. The other medical and health services component has a direct effect of 14 employees and an employment multiplier of 1.29, to bring the total impact to 18 employees. The total employment impact of the health sector in the medical service area is estimated at 173 full-time and part-time employees (**Table 7**, total of column 4).

Applying the income multipliers to the income (payroll plus benefits) for each of the health sector components yields an estimate of each component's income impact on the Central Oklahoma Family Medical Center service area (**Table 7**, columns 5, 6, and 7). The physicians, dentists & other medical professionals component has a total payroll of \$6,444,000; applying the income multiplier of 1.12 brings the total hospital income impact to \$7,223,357 ($\$6,444,000 \times 1.12 = \$7,223,357$). The pharmacy component has a total impact of \$497,823, based on the application of the income multiplier of 1.13 to the payroll of \$440,000. The home health has a total income impact of \$473,620, based on the application of the income multiplier of 1.11 to the payroll for this component of \$426,000. The other medical & health services component has an income impact of \$629,662, based on the direct payroll of \$490,000 and an income multiplier of 1.29. The total income impact of the health sector in the medical service area is projected to be \$8,824,462 (**Table 7**, total of column 7).

Income also has an impact on retail sales. The county ratio between retail sales and income has been estimated based on a ratio of retail sales to total personal income in Seminole County. The direct and secondary retail sales generated by the health sector and its employees is

estimated at \$2,576,743 (**Table 7**, total of column 8). The amount of sales tax generated from a one-cent sales tax was estimated at \$25,767 collected annually.

Each of the health sector components' income impacts is utilized to determine the retail sales for each component. Then the health sector components are totaled to determine the direct and secondary retail sales generated by the health sector. This estimate is probably low, as many health care employees will spend a larger proportion of their income in local establishments. The bottom line is that the health sector not only contributes greatly to the medical health of the community, but also to the economic health of the community.

SUMMARY

The economic impact of the Central Oklahoma Family Medical Center, a community health center, upon the economy of the 74849 Konawa zip code medical service area is tremendous. The community health center employs a large number of residents, similar to a large industrial firm. The secondary impact occurring in the community is extremely large and measures the total impact of the clinic. If the clinic increases or decreases in size, the medical health of the community as well as the economic health of the community are greatly affected. For the attraction of industrial firms, businesses, and retirees, it is crucial that the area have a quality health sector. Often overlooked is the fact that a prosperous health sector also contributes to the economic health of the community.

NOTES REGARDING METHODOLOGY UTILIZED

The resources provided by the community health center will determine the components of the services as specified in **Tables 6** and **7**. If the community health center is very small and it provides only physician services, one component will be available in the IMPLAN model. Each component is represented by a sector in the IMPLAN model. Health sectors in the model are:

- Hospitals
- Physicians, Dentists, and Other Medical Professionals Offices
- Home Health Care
- Nursing Homes
- Pharmacies
- Other Medical and Health Services

Each sector will have a different income and employment multiplier and thus it is important to have the services of a rural health sector broken down into components.

The market service area for the community health center will have to be determined for which the impact analysis is being conducted. In many cases, the service area will be smaller than a county. If this is the case, a zip code or group of zip codes will have to be used for the analysis. Zip code data must be purchased directly from the Minnesota IMPLAN group.

The example presented in this study does not include a hospital within the medical service area. If a hospital is within the medical service area, the impact of the physicians working in the community health center on the hospital must be included as a direct impact. Thus, if the community health center physicians account for 20 percent of inpatient days at the hospital, then they should have an impact of 20 percent of the inpatient hospital employment and

payroll. Without the community health center physicians, these admissions may not occur in the local hospital. The community health center and hospital would have to work together to arrive at the direct employment and payroll impact of the community health center physicians on the hospital.

If you encounter problems when applying the IMPLAN model to measure the economic impact of a community health center, please email Cheryl St. Clair (cheryl@okstate.edu) or Gerald Doeksen (gad@okstate.edu) or call the National Center for Rural Health Works for either Cheryl or Gerald (405-744-6083).

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APPENDIX A

Model and Data Used to Estimate Employment and Income Multipliers

APPENDIX A

Model and Data Used to Estimate Employment and Income Multipliers

A computer spreadsheet that uses IMPLAN multipliers was developed to enable community development specialists to easily measure the secondary benefits of the health sector on a state, regional, county, or zip code economy. The complete methodology, which includes an aggregate version, a disaggregate version, and a dynamic version, is presented in Measuring the Economic Importance of the Health Sector on a Local Economy: A Brief Literature Review and Procedures to Measure Local Impacts (Doeksen, et.al., 1997). A brief review of input-output analysis and IMPLAN are presented here.

A Review of Input-Output Analysis

Input-output (I/O) (Miernyk, 1965) was designed to analyze the transactions among the industries in an economy. These models are largely based on the work of Wassily Leontief (1936). Detailed I/O analysis captures the indirect and induced interrelated circular behavior of the economy. For example, an increase in the demand for health services requires more equipment, more labor, and more supplies, which, in turn, requires more labor to produce the supplies, etc. By simultaneously accounting for structural interaction between sectors and industries, I/O analysis gives expression to the general economic equilibrium system. The analysis utilizes assumptions based on linear and fixed coefficients and limited substitutions among inputs and outputs. The analysis also assumes that average and marginal I/O coefficients are equal.

Nonetheless, the framework has been widely accepted and used. I/O analysis is useful when carefully executed and interpreted in defining the structure of a region, the inter-dependencies among industries, and forecasting economic outcomes.

The I/O model coefficients describe the structural interdependence of an economy. From the coefficients, various predictive devices can be computed, which can be useful in analyzing economic changes in a state, a region or a county. Multipliers indicate the relationship between some observed change in the economy and the total change in economic activity created throughout the economy.

MicroIMPLAN

MicroIMPLAN is a computer program developed by the United States Forest Service (Alward, et al., 1989) to construct I/O accounts and models. Typically, the complexity of I/O modeling has hindered practitioners from constructing models specific to a community requesting an analysis. Too often, inappropriate U.S. multipliers have been used to estimate local economic impacts. In contrast, IMPLAN can construct a model for any county, region, state, or zip code area in the United States by using available state, county, and zip code level data. Impact analysis can be performed once a regional I/O model is constructed.

Five different sets of multipliers are estimated by IMPLAN, corresponding to five measures of regional economic activity. These are: total industry output, personal income, total income, value added, and employment. Two types of multipliers are generated. Type I multipliers measure the impact in terms of direct and indirect effects. Direct impacts are the changes in the activities of the focus industry or firm, such as the closing of a hospital. The focus business changes its purchases of inputs as a result of the direct impacts. This produces indirect impacts in other business sectors. However, the total impact of a change in the economy consists of direct, indirect, and induced changes. Both the direct and indirect impacts change the flow of dollars to the state, region, or county's households. Subsequently, the households alter their consumption accordingly. The effect of the changes in household consumption on

businesses in a community is referred to as an induced effect. To measure the total impact, a Type II multiplier is used. The Type II multiplier compares direct, indirect, and induced effects with the direct effects generated by a change in final demand (the sum of direct, indirect, and induced divided by direct. An additional multiplier, Type SAM (Social Accounting Matrices) is also available. Contact IMPLAN for further details (contact information is below).

Minnesota IMPLAN Group, Inc. (MIG)

Dr. Wilbur Maki at the University of Minnesota utilized the input/output model and database work from the U. S. Forest Service's Land Management Planning Unit in Fort Collins to further develop the methodology and to expand the data sources. Scott Lindall and Doug Olson joined the University of Minnesota in 1984 and worked with Maki and the model.

As an outgrowth of their work with the University of Minnesota, Lindall and Olson entered into a technology transfer agreement with the University of Minnesota that allowed them to form MIG. At first, MIG focused on database development and provided data that could be used in the Forest Service version of the software. In 1995, MIG took on the task of writing a new version of the IMPLAN software from scratch. This new version extended the previous Forest Service version by creating an entirely new modeling system that included creating Social Accounting Matrices (SAMs) – an extension of input-output accounts, and resulting SAM multipliers. Version 2 of the new IMPLAN software became available in May of 1999. For more information about Minnesota IMPLAN Group, Inc., please contact Scott Lindall or Doug Olson by phone at 651-439-4421 or by email at info@implan.com or view their website at www.implan.com.